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Title: Replacement of Wooden Wing Walls and Deteriorated Concrete Pad at  
Manhattan Project Era Magazine TA-16-58

Author(s): Brunette, Jeremy Christopher  
Garcia, Kari L. M

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LA-UR-18-

June 2018

# **Replacement of Wooden Wing Walls and Deteriorated Concrete Pad at Manhattan Project Era Magazine TA-16-58**

## **Los Alamos National Laboratory**

**Historic Building Report No. 374**

**Survey No. 1233**



Prepared for: the U.S. Department of Energy/National Nuclear Security Administration,  
Los Alamos Field Office

Prepared by: Jeremy C. Brunette, Cultural Resources Manager  
Kari L. M. Garcia, Cultural Resources Manager  
LANS Environmental Stewardship Group (EPC-ES)

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## Executive Summary

The U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office (Field Office) proposes to replace missing and broken asbestos shingles, reconstruct deteriorated wooden wing walls, and remove and replace a concrete pad on Building 58 in Technical Area (TA) 16 at Los Alamos National Laboratory (LANL). Building TA-16-58 is a Manhattan Project Era magazine that was evaluated and determined eligible, in consultation with the State Historic Preservation Office (June 5, 2003 and June 22, 2003, respectively), for listing in the National Register of Historic Places (Register) in *ESA Division's Five-Year Plan: Consolidation and Revitalization at Technical Areas 3, 8, 11, and 16* and in *Sentinels of the Atomic Dawn: A Multiple-Property Evaluation of the Remaining Manhattan Project Properties at Los Alamos (1942–1946)* (McGehee et al. 2003a, 2003b). The building is a LANL candidate for preservation as identified in *A Plan for the Management of the Cultural Heritage at Los Alamos National Laboratory, New Mexico* (LANL 2017a). It is also eligible for inclusion in the Manhattan Project National Historical Park (i.e., identified in the Park legislation), and is located within the TA-16 potential Cold War historic district (McGehee 1995a, 1995b; LANL 2012,).

Magazine TA-16-58 was constructed in 1944 to support Manhattan Project high explosives operations. The building remained in active use in the same capacity through the Cold War. The proposed replacement of deteriorated wooden wing walls and replacement of a concrete pad will not adversely affect the building because the replacement of the wooden wing walls and concrete will be with in-kind materials ensuring that those qualities that make the historic property eligible for the Register will not be affected. Replacement of these features are necessary maintenance and repair activities that prevent demolition by neglect.

In compliance with the National Historic Preservation Act of 1966, as amended, and the *Programmatic Agreement among the U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation Concerning Management of the Historic Properties at Los Alamos National Laboratory, Los Alamos, New Mexico*, the Field Office is initiating consultation on the proposed undertaking to replace broken and missing shingles, deteriorated wooden wing walls, and concrete pad. The Field Office is also requesting concurrence with the determination of no adverse effect for this undertaking.

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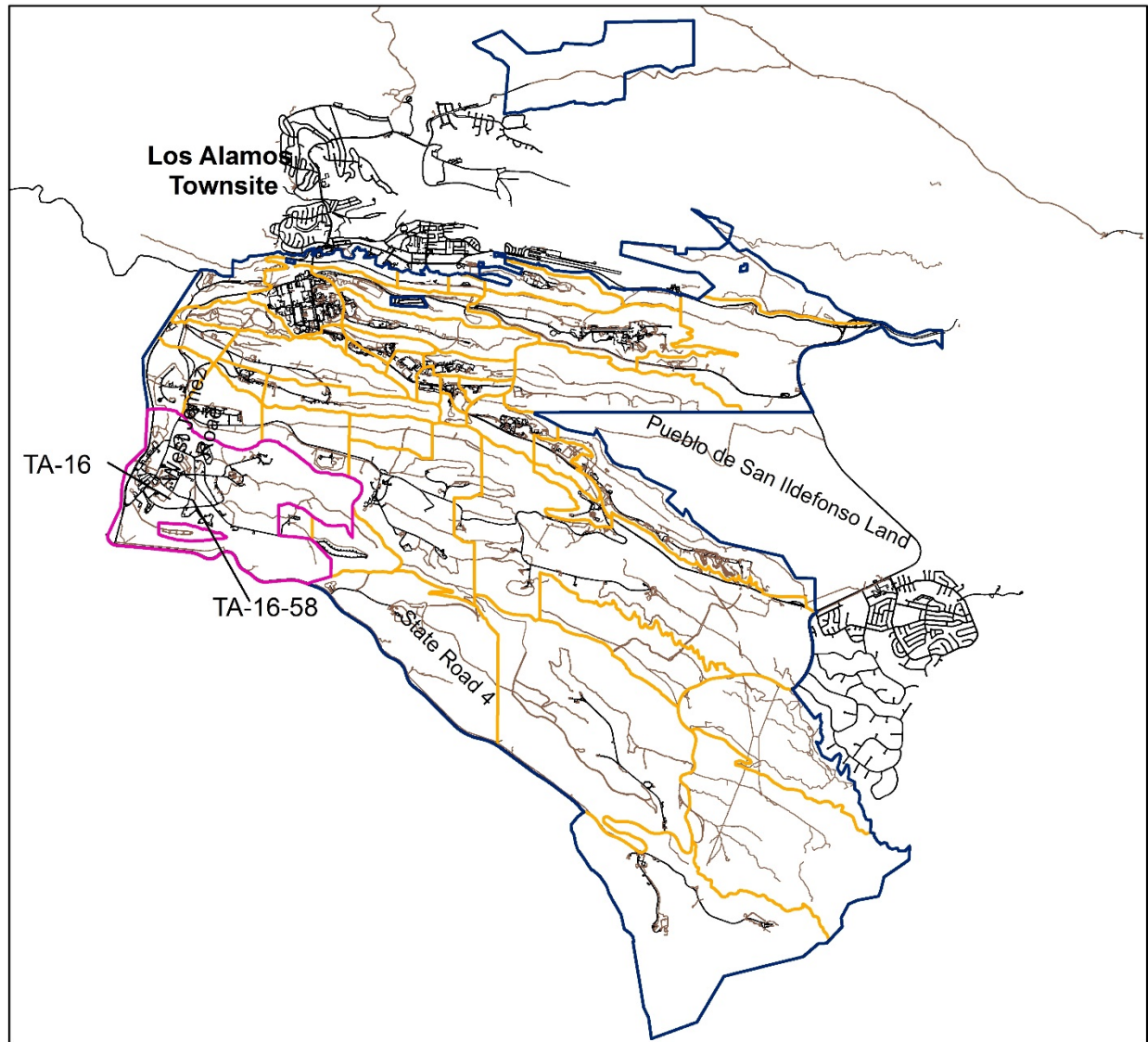
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## **Introduction**

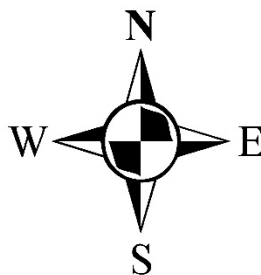
The U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office (Field Office) proposes to complete repairs to Building 58 at Technical Area (TA) 16 at Los Alamos National Laboratory (LANL) (Maps 1 and 2). Magazine TA-16-58 was constructed in 1944 to support the high explosives component of early nuclear weapons research and development during the Manhattan Project, specifically the development of cast high-explosives lenses used in the Fat Man implosion weapon (McGehee et al. 2003a, 2003b).

TA-16-58, is a Manhattan Project Era magazine building that is eligible for listing in the National Register of Historic Places under Criterion A (concurrence dates are June 5, 2003 and June 22, 2003). The building is also a LANL candidate for preservation and is eligible for inclusion in the Manhattan Project National Historical Park. This magazine features reinforced concrete floor, walls to 6 feet, and above 6 feet wood frame walls with asbestos containing “transite” siding, and site-built wooden trusses. A protective grass-covered earthen berm surrounds the building on three sides. The fourth east-facing side features a steel double door, concrete pad, and wooden wing walls that keep the dirt berm in place. The non-original wing walls are constructed of chromate copper arsenate (CCA) containing pressure-treated lumber that was painted to match the building. These wooden wing walls have deteriorated to the point of collapse and it is proposed that they be replaced with non-CCA pressure-treated wood and painted to match the building. The concrete pad is original to the building and it has deteriorated to the point where there is little structural integrity left. It is proposed that the original concrete be replaced with a new concrete pad. The ends and wood frame sides of the building have “transite” asbestos containing shingles. Many of these shingles are broken and it is proposed that the broken shingles be replaced with non-asbestos containing replicas. Based on the information contained in this document, the Field Office is requesting concurrence with the determination of no adverse effect for this undertaking.



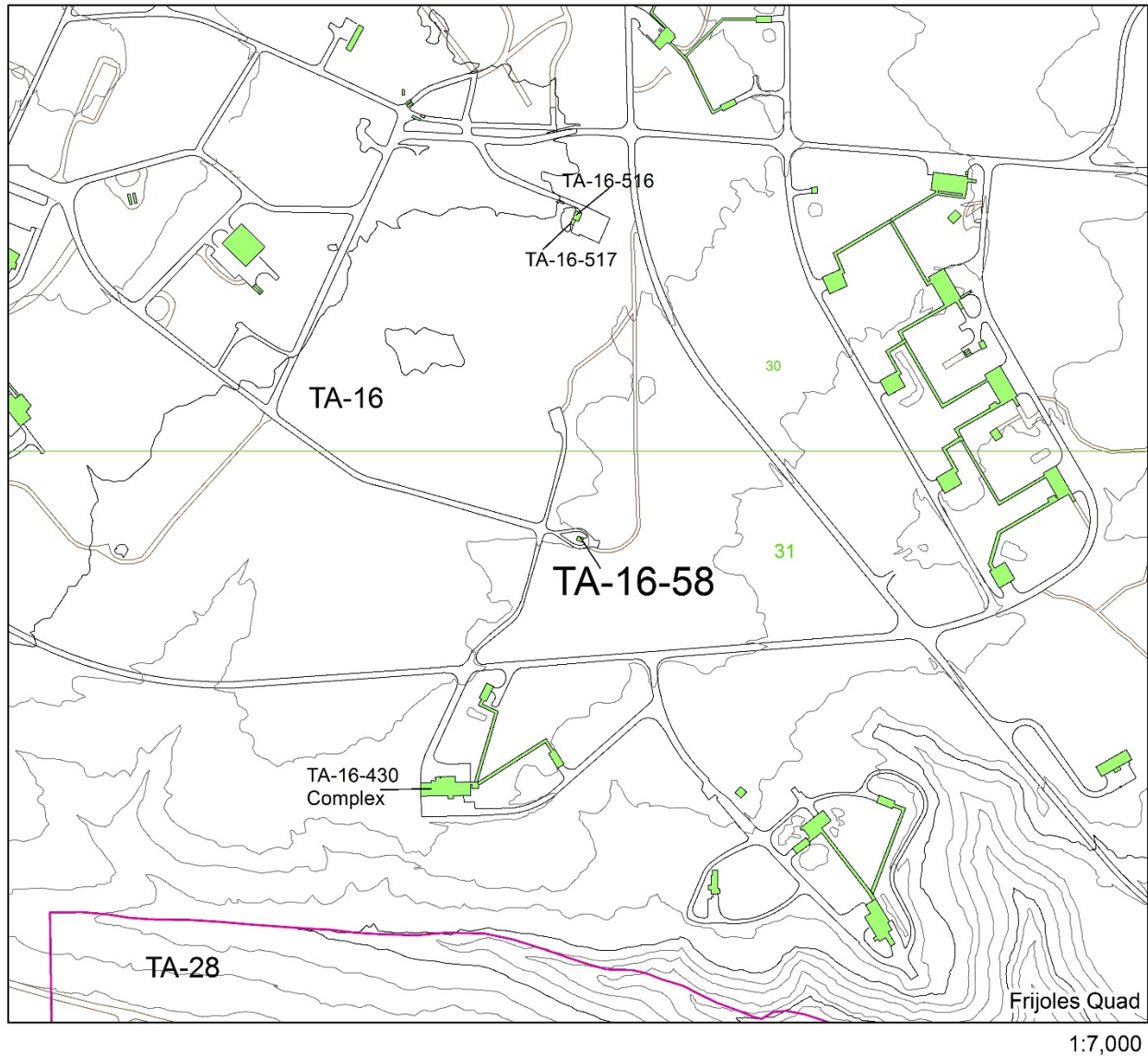
**Los Alamos**  
**National Laboratory**  
*Resources Management Team*  
*EPC-ES Environmental*  
*Stewardship Group*

## LANL Boundary and TA-16



- Technical Area 16
- LANL Boundary
- Technical Areas
- Dirt Roads
- Paved Roads

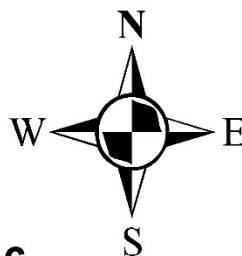
Map 1



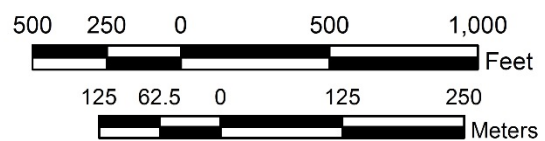
## Los Alamos National Laboratory

*Resources Management Team  
EPC-ES Environmental  
Stewardship Group*

### Location of TA-16-58 within Technical Area 16



Map 2



- Buildings/Structures
- Technical Area 16
- Drainage
- 20 Foot Contours
- 100 Foot Contours
- Township, Range, Section
- USGS 7.5 Minute Quad
- Dirt Roads
- Paved Roads

## Historical Background

### ***Historical and Cultural Significance***

The high explosives components of the implosion design were developed, manufactured, and tested at TA-16 during World War II. Early activities at TA-16 supported the development of the first implosion-type atomic bombs: the Trinity device and the Nagasaki bomb (code-named Fat Man). TA-16 was the principal site that manufactured high-explosives castings and lenses to produce a spherical means of detonating an explosive charge—the lenses served to direct the explosion inward. A symmetrical implosion was the key component in the critical assembly of the plutonium contained in the Trinity device and the Fat Man bomb (McGehee et al. 2003b). Constructed in March of 1944, the structure is the last remaining high-explosives magazine built to support S-Site operations during the Manhattan Project (LANL 2017b).

### ***Architectural Significance***

The building is a typical high-explosives storage magazine. Safety features were incorporated into the design of the wartime high-explosives facilities at S-Site; safe quantities, safe distances, and appropriate levels of protection were considered for each type of explosives activity. These safety standards were first developed by the Department of Defense Explosives Safety Board in 1928. In general, magazines are built of reinforced concrete. Their low, barrel-arched roofs are constructed with a kind of steel-wire mesh designed to release pressure in the event of an accidental detonation, thus minimizing the hazard to surrounding areas. Earthen berms at the sides of the magazines are designed to dampen the force of a potential explosion, while the “igloo” shape of the magazines directs the force of an accidental explosion upward rather than outward, thus decreasing the chance of causing sympathetic or chain-reaction explosions at adjacent magazines. The amount of material stored in the magazines and the distance between them is regulated (McGehee et al. 2008).

### ***Use History***

The structure was built in March of 1944. The need for a large casting plant and widely separated test sites was apparent during the winter of 1943. The early S-Site facilities included an office building, a steam plant, a casting house, storage magazines, and high-explosives preparation buildings. Due to construction delays and difficulty procuring equipment, TA-16 operated only on a limited basis by May 1944 and did not begin steady operation until August of the same year (McGehee et al. 2003b). S-Site is still an active high-explosives area. The TA-16-58 magazine supported Cold War high-explosives operations at TA-16 and was in continual use from its initial construction through the late Cold War years. The structure is currently vacant.

## Proposed Repairs to TA-16-58 Magazine

There is evidence that the original wing walls for TA-16-58 were located closer to the building than the current wing walls (Figure 1). This can be seen in an as-built drawing dated August 11, 1964, and by visible postholes in the original concrete stem walls located next to the concrete pad (Figure 2 and 3).



Figure 1. Wing walls in current configuration



Figure 2. Concrete stem wall with postholes

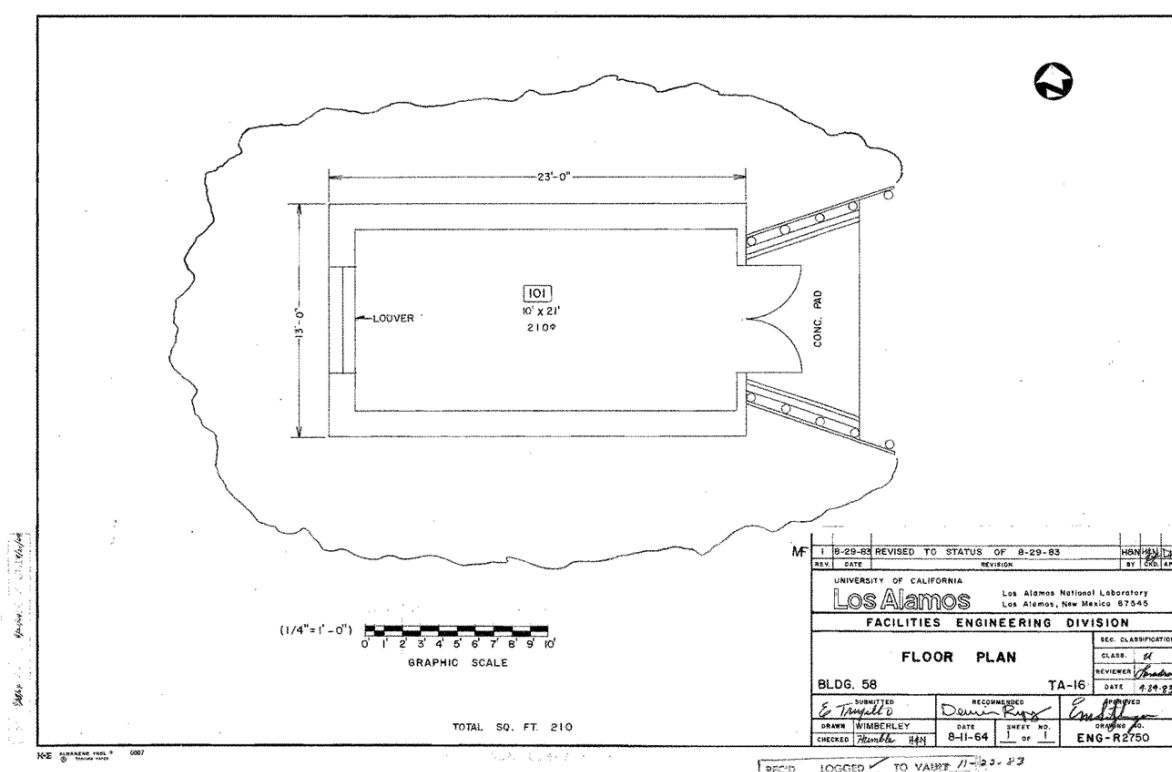


Figure 3. As-built drawing from 1964

The existing wing walls at TA-16-58 are not original to the structure and are constructed of CCA pressure-treated lumber that was painted an off-white color to match the magazine (Figure 4). It is proposed that new alkaline copper quaternary pressure-treated lumber wing walls be installed and painted off-white to match the building. The new wing walls will be physically and visually compatible with the existing wing walls but will be identifiable upon close inspection to be a replacement. The new wing walls will protect the historic character of the building since they are a character-defining feature. Intact and stable wing walls serve to retain the protective dirt berm around the building and help to direct energy from an accidental explosive detonation to the south and away from other buildings in the area.

The concrete pad has deteriorated to the point that the top surface is gone, and grass is growing through the concrete (Figure 5). It is proposed that the existing concrete pad be removed and a new concrete pad of the same dimensions be installed. An analysis of the existing concrete will be made to determine the proper aggregate, sand and cement composition for the replacement concrete.

Cultural Resources staff will take photos to document all repairs. The photos will be stored with the Environment Stewardship Group at LANL.



Figure 4. Photo showing wing wall deterioration



Figure 5. Photo showing grass growing in concrete pad

There are existing Manhattan Era stem walls that show a lot of degradation, including spalling concrete that is likely due to moisture penetration and freeze-thaw cycles that has left the aggregate exposed on the top of the walls. These stem walls should be preserved at this time because they contain the postholes that indicate where the original wing walls were located. It is proposed that these stem walls be sealed with a urethane or polyurethane sealant as described in Preservation Brief 15 (Gaudette and Slaton 2007) to aid in protecting them from moisture penetration, and that the walls be documented with photographs and measured drawings and retained in place to document the original wing wall location.

## Conclusion

The replacement of the wooden wing walls, the concrete entrance pad, and broken or missing asbestos siding shingles to TA-16-58 (Manhattan Project Era magazine) will not alter or adversely affect the characteristics that make this building eligible for listing in the Register. In compliance with the National Historic Preservation Act of 1966, as amended, and the *Programmatic Agreement among the U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation Concerning Management of the Historic Properties at Los Alamos National Laboratory, Los Alamos, New Mexico*, the Field Office is initiating consultation on the proposed wooden wing wall replacement and repairs to the concrete pad and siding shingles to Register eligible Building TA-16-58. The proposed replacement and repairs will support the continued preservation of this Manhattan Project Era building, which is also one of LANL's candidates for preservation and is eligible for inclusion in the Manhattan

Project National Historical Park (i.e., identified in the Park legislation). The Field Office is requesting concurrence with the determination of no adverse effect for this addition.

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